



DOMINION OF CANADA

# Department of Agriculture

Branch of the Live Stock Commissioner.

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## THE CARE OF MARKET EGGS

By W. A. BROWN, B.S.A.

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BULLETIN NO. 16.

Published by Direction of the  
HON. MARTIN BURRELL, Minister of Agriculture,  
OTTAWA, ONT.

May 1st, 1912



Ottawa, May 1st, 1912

The Honourable Martin Burrell,  
Minister of Agriculture,  
Ottawa, Ont.

Sir,—

I have the honour to present a paper by Mr. W. A. Brown, B. S. A., of this Branch, entitled "The Care of Market Eggs."

This pamphlet directs particular attention to the nature of losses resulting from inadequate and unsatisfactory methods in the handling of market eggs, and suggests means by which permanent and needed improvement may be brought about in the Canadian egg trade, to the corresponding advantage of both producer and consumer.

The marketing of poultry products is a comprehensive subject and it has been thought advisable to restrict this treatise to a discussion of but one feature of the industry. It is believed that the information which it contains will be of timely interest to farmers and poultry men generally. I would recommend, therefore, that it be published for distribution as Bulletin No. 16 of the Live Stock Branch.

I have the honour to be,

Sir,

Your obedient servant,

H. S. ARKELL,

Acting Live Stock Commissioner.

### Acknowledgment.

The author desires to acknowledge the valuable assistance of Drs. Higgins and Evans, of the Pathological Division of the Health of Animals Branch in the preparation of certain technical photographs for use in this bulletin.

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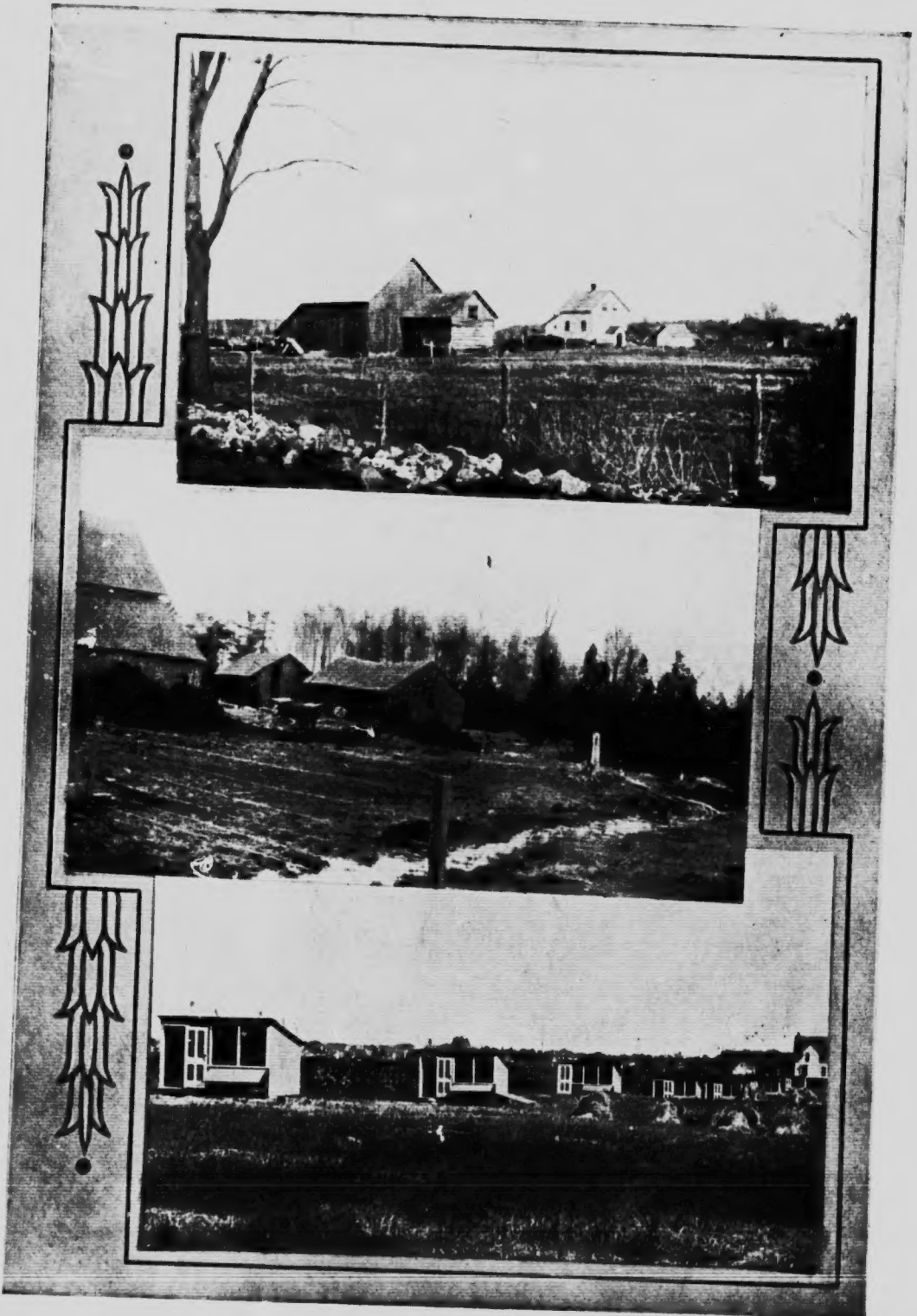
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A Contrast in Methods of Keeping Poultry on the Farm

# The Care of Market Eggs.

## Introduction.

Eggs are a perishable food product. They do not improve with age and no amount of handling or manipulation will enhance their quality. The poor quality of the average market egg has been attributed by many persons to its retention in cold storage. This is an erroneous idea, for while the quality will not improve, yet if the eggs are full and fresh and sweet when placed in a well equipped and properly managed cold storage, there is not, during the time they are ordinarily held, sufficient change in quality to render them unfit for food.

Marked improvement has been made in the methods of handling other kinds of food stuffs. The same old, antiquated methods of handling eggs that prevailed many years ago, prevail to-day. This bulletin is a preliminary attempt to analyse the situation and point out ways and means of improvement.

## Extent of Loss Resulting from Careless Methods.

So great is the shrinkage and loss in the egg trade and so inferior the quality of the average egg on the market, that the consumption of eggs would, no doubt, be seriously curtailed were it not for the fact that eggs are a staple in the general routine of household economy. They are prized as a high-class breakfast dish by practically everyone and are valued as a tonic, stimulant and almost perfect food for invalids, convalescents and children.

Gross neglect, carelessness, dishonesty and a general lack of appreciation of the perishable nature of an egg are causing to the Canadian egg trade a loss of several million dollars annually.

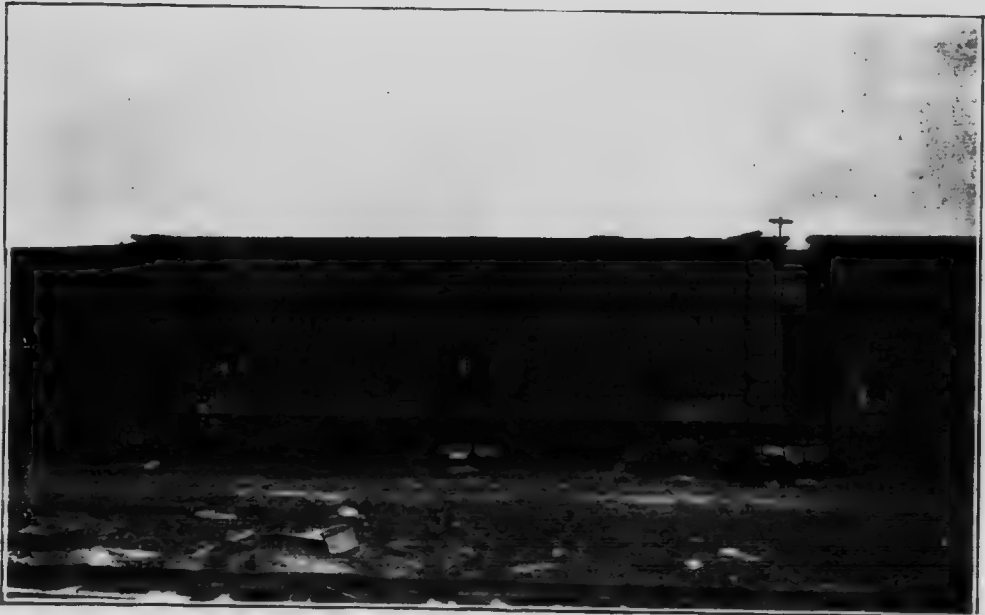
## The Usual Method of Handling Eggs.

Eggs under average conditions take a very circuitous course in reaching the consumer. Someone on the farm gathers the eggs whenever convenient, sometimes once a day, sometimes two or three times a week. They are carried to the house and held until such time as is convenient to take them to market. Then if the number available seems small, a hasty search, by the children, will usually reveal some hidden nests, the contents of which are added to those in the basket without question as to their condition or state of incubation.

These eggs are for the most part traded for merchandise at the country store and there, as a rule, their quality does not improve since they are often held for varying lengths of time and stored in questionable places. The egg buyer receives them next and, if working for the big packing firms, he hurries them on with all possible speed. If working for himself, he is apt to hold them, particularly on a rising market. From observation one might infer that the common carriers, the railways and the express companies are, at times, rather too prone to forget that the egg is perishable and the shell fragile, if one is to judge by their frequent lack of care in handling and in leaving them exposed to extreme heat on station platforms and in hot express cars.



**Fig. 1—A Cooper System Cold Storage Plant, Capacity 10,000 (30 dozen) Cases of Eggs**



**Fig. 2—A Refrigerator Car, used in Interprovincial Shipments, and by some Dealers in making Collections.**

Of course, there are careless dealers and commission men who allow the eggs to deteriorate in their hands. but as a whole the eggs receive better treatment in this section of trade than in any other. The dealers know that they cannot improve the quality of the individual egg, and the large majority of them honestly endeavour to prevent further deterioration in the shipments as received. By candling they remove the bad, the shrunken, the broken, the dirty eggs, etc., from among the good eggs, and place them in the grades where they belong. Many firms have established regular purchase days and their buyers make regular rounds and shipments. Some firms even retain, for their own use, a number of refrigerator cars, which are despatched regularly to receiving points. Eggs thus received are candled and some may be placed in storage. The dealer sells the eggs to the jobber or may sell direct to the retailer. As a rule, the jobber does not hold them long, and in fact may never see them.

The average retailer or city grocer can and should improve his methods considerably. It is business to advertise his goods, but he seems to forget that, while eggs will not melt and run away like butter or readily sour like milk or cream, they are nevertheless perishable. Many a grocer has lost good customers through unduly exposing his eggs behind a plate glass window in a heated store or by leaving them for a period of days close to a stove, a register or some other source of heat. The customer, in turn who is justly irritated at finding only eight or ten good eggs in a dozen, has no more justification than has the farmer's wife for placing the eggs on the top shelf in the kitchen cupboard, when the proper place for them is in a refrigerator or in a cellar where they will not come in contact with any mustiness, foul odors or other sources of contamination.

### The Present System of Trading at the Country Store, Conducive to a Continuation of Careless Methods.

A great many bad eggs find their way into the market through the old-time practice of exchanging eggs for merchandise at the country store. Many a merchant would gladly give up the egg trade if he could. It places him in a very awkward position. He knows that to buy eggs is to sell goods. Therefore, it is not good business to refuse eggs and if he bids low his customer will go to his competitor across the street. He does not have the means to detect the bad eggs and some farmers knowing this take undue advantage of him. In fact the merchant has not time to candle eggs and buy on a loss-off basis, in the rush of the summer season. Many farmers put off their marketing until Saturday afternoon or evening and in the course of five or six hours the merchant may take in several thousand dozen. In the State of Kansas, where it has been made a criminal offence to offer, for sale, eggs unfit for food and the dealers have agreed to buy on a loss-off basis only, the country merchants have had a very good excuse for relinquishing their share in the trade. The eggs now go direct to the dealers and the result is a marked improvement in quality.

### The Results of Lack of Care.

In order to secure some adequate evidence on the lack of care, the resultant losses, causes of loss and the distribution of same throughout the year, a series of

questions were sent out to over two hundred egg dealers in Canada. The first question was :—

“With reference to your own experience, do you consider the suggested figure of seventeen per cent for total shrinkage, too high.”

The answer from those engaged in handling eggs, direct from the farm or the country store, has been invariably “No” and some have indicated that the figure is not high enough. In fact the sum total of the estimates given in the subsequent pages slightly exceeds seventeen per cent.

### *I.—The Loss Through the Sale of Heated Eggs or Eggs in which the Germ has Commenced to Grow.*

As a result of the heating of fertile eggs, from four to six per cent of all eggs marketed are unfit for human food. A temperature of 70° F. or higher will start the germ of a fertile egg to grow. The greatest loss is apparent between the months of June and September although such eggs are often held until later.

In nature the purpose of an egg is to hatch a chick, but when man intends an egg for food he should aim to defeat that purpose. He must distinguish between an egg for hatching and an egg for market and eliminate the fertile eggs from the marketable product by excluding the male bird from the pen at all times except during the breeding season.

### *II.—The Loss Through the Sale of Shrunken, Held and Stale Eggs.*

Sixty-five per cent of the contents of an egg is water ; the shell is porous and evaporation takes place whenever the egg is surrounded by a temperature above freezing. The higher the temperature and the more rapid the air circulation, the greater will be the evaporation.

An egg will grow stale in the nest, if the house is hot and ill-ventilated or if broody and other hens sit on it. The water content will evaporate just as readily in the consumer's cupboard as in the farmer's kitchen and the country merchant has no more right to keep his eggs near the stove than the city grocer has to place his behind the plate glass window.

Eggs in cold storage are held at a temperature of about 30° and the fact that the average merchant or buyer has not similar facilities is ample reason why the eggs should not be held. Notwithstanding this, however, the practice of holding eggs for higher prices is so common that a shrinkage of not less than five per cent. results. This is most apparent in the fall months, but has to be taken seriously into account from June until January inclusive.



Fig. 3—Eggs placed in Store Windows Deteriorate rapidly.

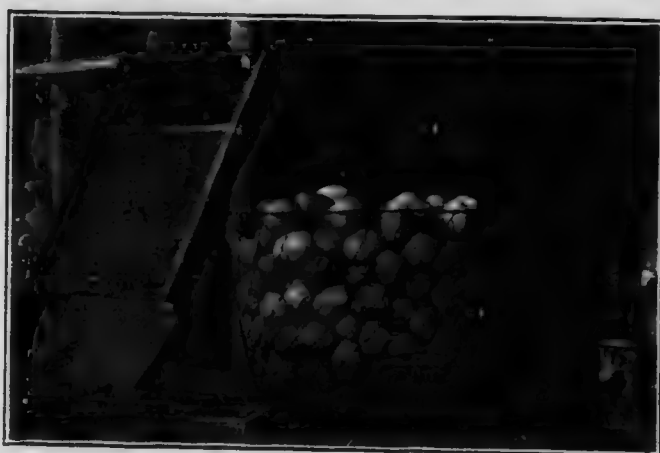


Fig. 4—A Basket that was used alternately for Eggs and Lemons



Fig. 5—Sun Struck

### *III.—The Loss from the Sale of Rotten Eggs.*

Rotten eggs like rotten apples find their way into the trade. They are not so readily detected, however, and for this reason are even a more serious menace. Common rots are the result of decomposition. The germ dies in a fertile egg. And under certain conditions rapid decomposition takes place and hydrogen sulphide gas is liberated. Eliminate



Fig. 6—A Heated Egg known to the Trade as a Heavy Float



Fig. 7—Egg showing from 8 to 12 days incubation

the fertile egg and this repulsive form of loss will disappear.

Other forms of rotten eggs occur. The albumen of an egg constitutes an excellent culture medium for the growth of bacteria. An egg is moist when laid, and in the foul, unsanitary condition of many nests readily becomes infected. The porous shell offers little or no resistance. The tough inner membrane is, however, practically bacteria proof unless brought in contact with excessive dampness



Fig. 8—Egg about Due to Hatch



or even exposed to moist conditions for some length of time. It is for this and other reasons that interested dealers send out the instructions, "Under no conditions wash eggs." If a washed egg is placed in the consumer's hands without delay little trouble may result ; but if the bacteria once enters into the albumen of an egg and that egg is held and exposed to conditions of moisture and warmth favourable to bacterial development, the different forms of spot rot readily appear. Some continue to grow even in the low temperature of a cold storage house. About three per cent. of all eggs are discarded on account of rot in some form and the loss is apparent throughout the year, with the exception, possibly, of the months of March and April.



Fig. 9—Fresh Egg from 4 to 5 days old, see air cell.

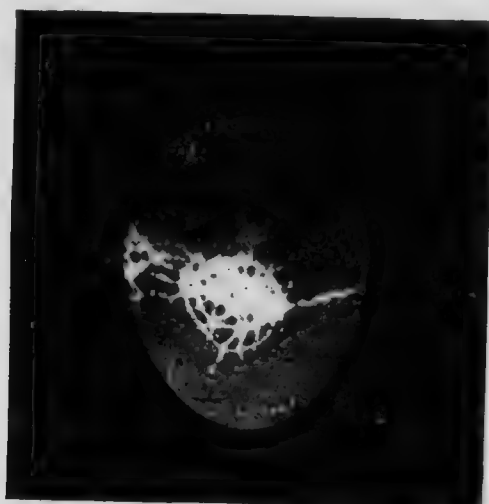


Fig. 10—New-Laid Egg, air cell scarcely perceptible, note extremely fragile shell.

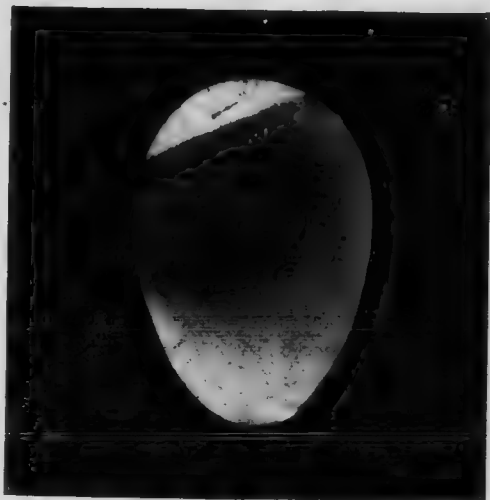


Fig. 11—Held Egg, the dark part indicates the Yolk.

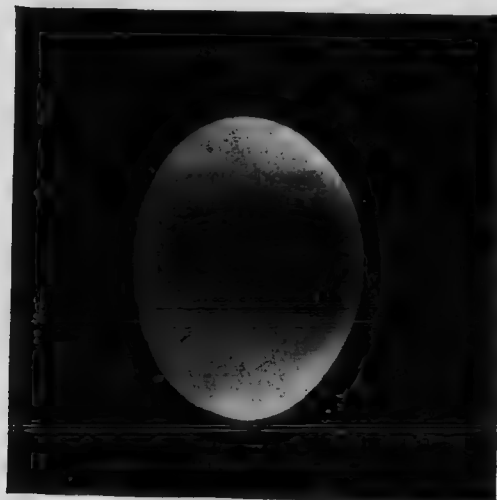


Fig. 12—Held Egg, shows greater evaporation than egg in Fig. 11.



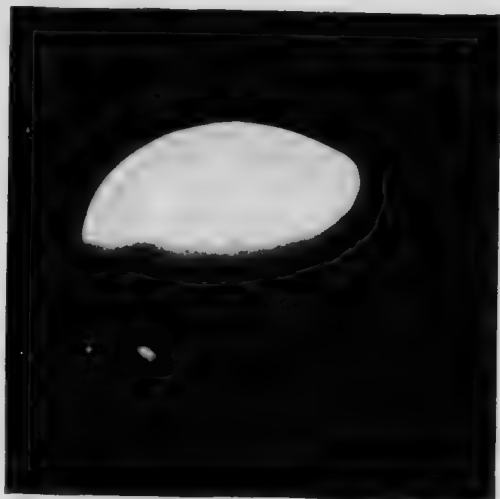


Fig. 13—A very Stale Egg, showing Broken Yolk and large Air Cell

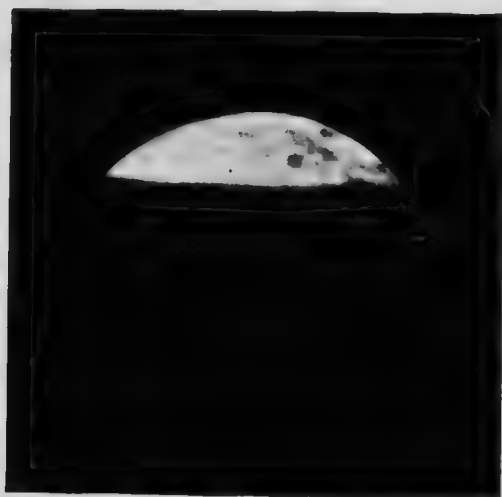


Fig. 14—A Rotten Egg.

#### IV.—The Loss Due to Breakage

Broken eggs are found in all sections of the trade. Accidents will occur, but carelessness and thoughtlessness account for a great deal of the breakage.

Broken eggs are known to the trade as leakers, dents or checks (blind checks). Leakers are not only a loss in themselves but they produce smeared eggs. Dents are eggs in which the shell is broken, but in which there is no rupture of the inner membrane apparent. Blind checks are the faint cracks not readily apparent to the eye. They are only detected by the use of the candle or by clicking two eggs together.



Fig. 15—Spot Rot.

Many eggs are broken in transit either through the jolting of loose or poorly packed eggs over the rough country roads or through careless handling by the cartage and express companies. Broken eggs, no matter how slight the break, should not be placed in any egg case intended for shipment. They not only constitute a loss themselves, but they soil the fillers and make them unfit for future use. At least three per cent. of all eggs marketed show breakage in some form and broken eggs are apparent at all seasons of the year, particularly in the spring.

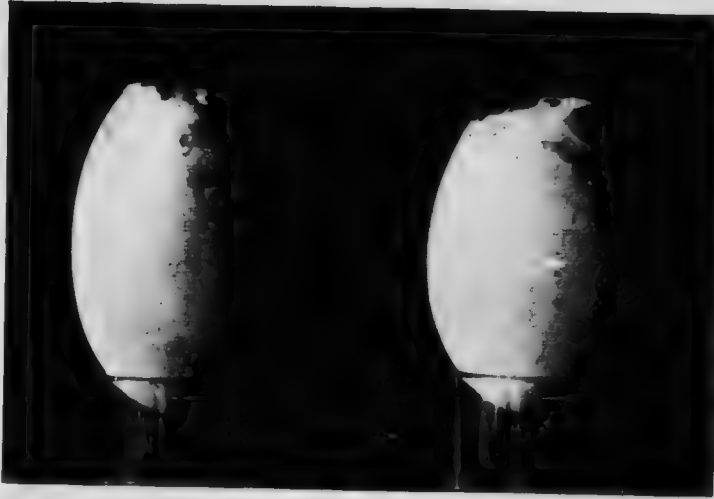


Fig. 16—Broken Ends—the Result of Shipping extremely Long Eggs in the average case.

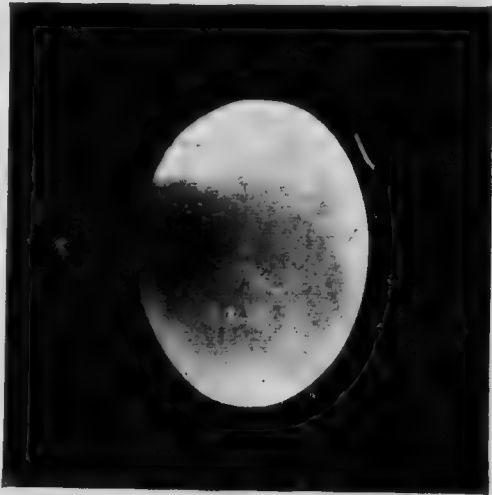


Fig. 17—A Faint Crack—Known to the Trade as a Hair Split.



Fig. 18—A Dent, as distinguished from a Leaker.



Fig. 19—Cracked Eggs.

*V.—Loss and Shrinkage Through the Sale of Dirty Eggs.*

Dirty eggs are of three kinds :—

- 1.—Plain dirties, those to which soil and manure adhere.
- 2.—Stained eggs, i.e. dirty eggs that have been washed.
- 3.—Smeared eggs, those that become covered with the contents of broken eggs.

The producer is largely to blame for the first two classes of dirty eggs. A

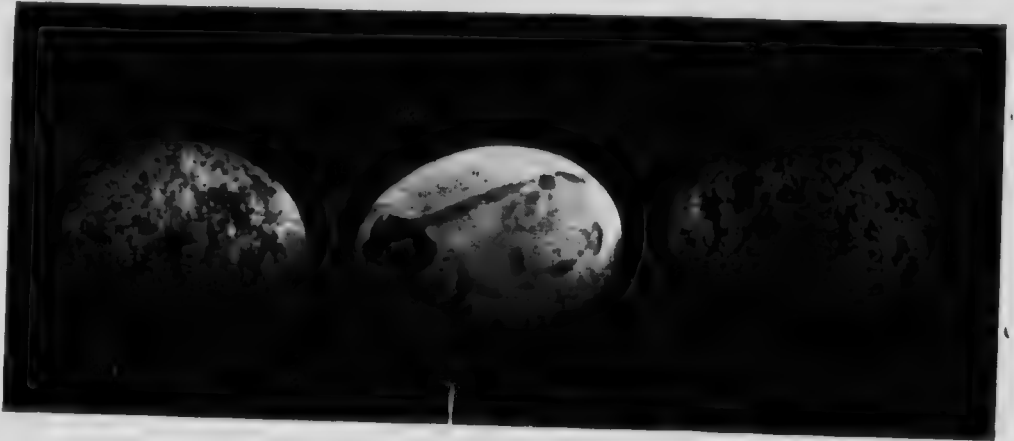


Fig. 20—Dirty and Smeared Eggs

dirty egg is a disgrace to the person who sells it. The hens should not be blamed for the appearance of dirty eggs. They almost invariably lay clean eggs and they prefer to lay them in clean, cool places.

Dirty eggs should never be marketed. They are repulsive to the trade and they seriously detract from the appearance of good eggs and cause the entire shipment to sell at a lower price. This may not be apparent at the country store



Fig. 21—Clean Eggs

where severe competition forces the merchant to take all or lose a customer, but the dealer is obliged at considerable expense, to remove most of them and must therefore discount the price he pays accordingly.

It is not wise to wash market eggs. Washing removes the natural bloom and gloss and makes the eggs appear old and stale. Clean nests should be provided, thereby reducing the number of dirty eggs to the minimum. About three per cent of all eggs marketed show contamination in this form and it is particularly apparent in the wet seasons, spring and fall.

#### *VI.—Loss Due to the Sale of Mouldy and Bad Flavoured Eggs.*

So readily do eggs absorb odors that in the early days of artificial refrigeration many packers incurred heavy financial loss through having stored their eggs



Fig. 22—Cracked Eggs commencing to Mould.

in chambers containing citrous fruits, fish, etc. In all modern cold storage houses large separate rooms are provided in which eggs alone are stored.

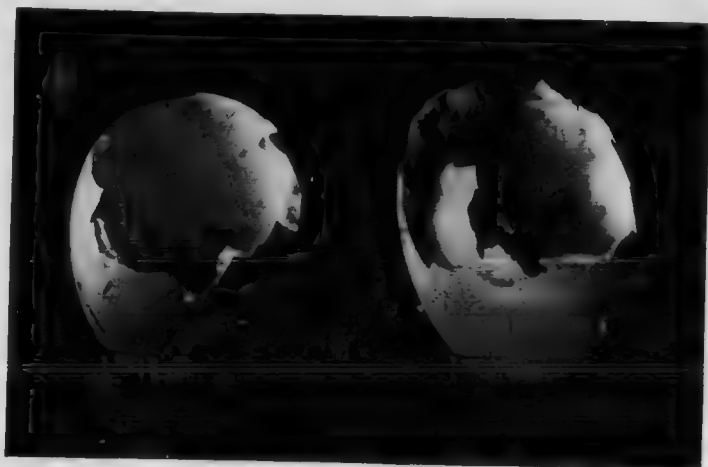


Fig. 23—A Shell found in an Egg Case.

Fig. 24—A Broken Egg showing a Heavy Growth of Mould.



FIG. 25—A Contrast. These five eggs were selected from 2 layers (5 dozen) of eggs in the same case.

No. 1 Weighs at the Rate of  $15\frac{1}{2}$ -16 oz. to the Dozen.

No. 3 Weighs at the Rate of  $21\frac{1}{2}$  oz. to the Dozen.

No. 2 Weighs at the Rate of 18-19 oz. to the Dozen.

No. 4 Weighs at the Rate of  $22\frac{1}{2}$ -23 oz. to the Dozen.

No. 5 Weighs at the Rate of  $24\frac{1}{2}$ -25 $\frac{1}{2}$  oz. to the Dozen.

Musty eggs are very common, due no doubt to their having been collected in pails or baskets containing damp, musty straw or litter or to their having been placed in egg cases containing old, soiled fillers. Eggs are often held in damp, musty cellars where decaying vegetables, kerosene, etc., are also stored. The different forms of mould appear in eggs just as in cheese and, while desirable in the one, are repulsive in the other. Care should be taken to eliminate all possible source of contamination in this way. It is difficult to estimate the amount of loss caused by the above stated factors because they influence the flavour rather more than the appearance and as such their effect is not apparent until the eggs are consumed. Dealers estimate that at least one per cent of all eggs are affected in this way, but the experience of the housewife indicates that this figure should be much higher.

#### *VII.—Loss from Frosted Eggs.*

While it is unfortunate that only a small proportion of all farm hens lay in the winter, it is even more so that such a large percentage of these eggs are allowed to become frosted. Frozen eggs are not only undesirable in themselves, but when they thaw they often, through leakage, cause smeared eggs. Frozen eggs and dirty eggs should be kept at home.

#### *VIII.—Loss from the Sale of Small Eggs.*

Some small eggs will no doubt always be produced, but there is no excuse for the large percentage found on the market at the present time. Pullets, commencing to lay, produce small eggs at first and old hens at moulting time are prone to do likewise. The great majority of small eggs, however, come from the mongrel, nondescript, stunted stock found on such a large proportion of our farms. Some of the small sized, light weight, pure bred stock is undesirable for the same reason. Eggs ought to weigh a pound and a half to the dozen or forty-five pounds, net, to the thirty dozen case. No figures are available at the present time to indicate the percentage of small eggs that are marketed, but anyone who has had experience in the egg trade must readily appreciate the extent of this difficulty.

### **Suggestions for General Improvement in Methods Followed on the Farm.**

It is evident from the foregoing discussion that, while all parties engaged in the egg trade are more or less to blame for the present lack of quality, yet the conclusions reached from our inquiry indicate that the great difficulty centres about the methods employed in handling eggs on the farm. Present conditions surrounding the production and marketing of farm eggs show distinct evidences of lack of care and appreciation of the fundamental considerations underlying the trade and, while it is the intention later, to point out some specific instances in

which all can make improvement, the following suggestions deal directly with general conditions on the farm :—

- 1.—Keep only pure bred stock of the larger general purpose varieties.
- 2.—Discard all stunted, nondescript and all diseased stock.
- 3.—Give the poultry-house a thorough cleaning every spring and keep it clean ; spray often, and whitewash walls, roosts, etc., regularly.
- 4.—Feed the flock on pure and wholesome food and provide pure water in clean utensils.
- 5.—Hatch the chickens early ; keep them separate from the old stock and give them every possible opportunity to grow into strong, healthy, vigorous, well matured birds before the cold weather comes, in the fall and early winter.
- 6.—Give the poultry the care and attention they deserve and, if the farmer has not the time or inclination to do the work himself, let him delegate it to some responsible member of his family.

### Specific Suggestions in Regard to the Proper Care of Market Eggs.

#### *To the Farmer.*

Remove the male birds from the flock immediately after the breeding season and market no fertile eggs.

Provide roomy nests and plenty of clean nesting material, preferably dry shavings or cut hay.

Keep the nests clean and sanitary.

Collect the eggs regularly at least once, better twice, a day in moderate weather and more frequently in very warm and very cold weather.

Remove at once in clean utensils to a cool, dry cellar.

Cover with clean cloth to prevent dust from settling upon them and also to prevent evaporation and fading.

Do not pack loose in a box when taking them to market, but rather secure a suitable egg case and thus avoid breakage.

Market as frequently and as directly as possible.

#### *To the Merchant.*

Buy on a loss-off basis, if possible, and encourage other merchants to do the same.

Insist that the farmers furnish first quality eggs only.

Keep in mind the perishable nature of the product and do not hold eggs on a rising market without proper facilities for storing them.

Realize that fresh eggs at any season of the year are much more valuable than stale eggs, when prices are higher.

When shipping, pack carefully in strong, clean cases and fillers.



### *To the Egg-Buyer.*

If buying direct from the farmer, make regular and frequent collections.

Pay a premium for quality and do not hesitate to condemn bad, dirty, small and broken eggs.

Encourage the farmer to keep better poultry and more of it.

If buying from the country merchant, encourage frequent shipments and if possible buy on a quality basis.

### *To the Railways and Express Companies.*

Handle eggs with care.

Provide suitable accomodation.

Guard against undue exposure to heat and cold.

Deliver with all reasonable despatch to the consignee.

### *To the Dealers and Packers.*

Indicate to the producer that, financially, quality counts for more than quantity.

Adopt without delay a basis of "quality payment." The system of "average payment" on a case count basis permits of a great deal of the carelessness and dishonesty that exists in the egg trade.

If the packers were to adopt the method of "quality payment" in its fullest sense the store-keepers and collectors could not afford to take eggs from producers regardless of quality.

### *To the Retailer.*

Buy eggs of assured good quality. If it is necessary to handle inferior eggs, sell them for what they are.

Encourage producers to forward their shipments direct.

Establish if possible, a brand of eggs, which will, in itself be a guarantee of good quality.

Every city re'ailer must realize how quickly the buying public of the better class proportions its consumption of eggs to the quality of the product. In fact, there is hardly any class of consumers, however careless, but which will increase consumption when the product is improved.

### *To the Consumer.*

Demand new laid eggs of good size and colour.

Insist that they be clean.

Learn to distinguish between a new laid egg and a stale egg ; a fresh egg and a storage egg.

If bad eggs are furnished, demand retribution.

Be willing to pay a premium for good eggs.

Having purchased eggs do not overlook their perishable nature and give them proper care.



Many consumers use the product of poor, unhealthy stock, kept in unsanitary surroundings rather than pay a cent or two more for clean, wholesome eggs. This is a direct bid for poor eggs.

The responsibility for present conditions rests in part therefore with the consumer and the whole trade will reap the benefit when the latter insists that he be supplied with nothing but first class eggs.

### Conclusion.

Improvement in the care of eggs is important from a financial point of view; in fact it is a business proposition. There is an enormous financial waste resulting not only from the absolute loss of thousands of dozens and the shrinkage in millions of others, but also from the cost of handling, packing and transporting so much worthless or practically worthless product. If the manufacturers and business men in Canada were to take no more care of the articles manufactured by them and no more pains in advertising and in placing first quality goods on the market, than is taken by farmers in handling and marketing eggs; how long would the average business be prosperous?

As a result of an investigation of the egg industry in the State of Kansas, seventy-four buyers, handling over nine hundred thousand cases of eggs annually, state that if the farmers of the State of Kansas would deliver eggs to the buyers in first class condition, they could pay two cents a dozen more the year round. Even greater advances have been made by Canadian dealers to the members of Egg circles in the Province of Ontario.

It is deplorable that a product, like eggs, so uniform when produced, in quality and composition, is allowed to deteriorate so seriously through gross neglect, carelessness and a lack of appreciation of its perishable nature.

It is evident that, if eggs are to reach the consumer's table in a fresh and palatable condition, the present antiquated system of handling and marketing them will have to be largely discontinued and more modern business-like methods adopted.